

SECTION 02936

SEEDING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preparation of seed bed.
- B. Seeding.
- C. Mulching.
- D. Watering and Maintenance.

1.2 SUBMITTALS

- A. Submit the following in accordance with the requirements of Sections 01300:
 - 1. Catalog data, including sources of supply for amendments, such as mulch, tackifier, fertilizer and mulch blankets.
 - 2. Certification substantiating that materials comply with specified requirements. Submit certified seed bag tags and copies of seed invoices identified by project name.
 - 3. Installation Instructions, including proposed seeding schedule. Coordinate with specified maintenance periods to provide maintenance from date of final acceptance. Once the schedule is accepted, revise dates only with LANL approval after documentation of delays.

1.3 QUALITY ASSURANCE

- A. Contractor Qualifications:
 - 1. Perform work by a single firm which is a licensed Landscape Contractor experienced with the type and scale of work required and having equipment and personnel adequate to perform the work satisfactorily.
- B. Material Quality Control:
 - 1. Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.
 - 2. Contract native grass seeding in this section to a single firm. Perform work by a licensed contractor experienced with the type and scale of work required, which includes having adequate equipment and personnel to perform the work.
 - 3. Furnish seed labeled in accordance with the requirements of federal and New Mexico statutes and regulations governing seed labeling; such resulting requirements include but are not necessarily limited to: Federal Seed Act and Amendments, rules and regulations established by the United States Department of Agriculture: the New Mexico Seed Law, and all resulting regulations or restrictions established by New Mexico State University or other authorized entity.
 - 4. In addition, ensure the seed mix and its application complies with the requirements of all other federal and New Mexico statutes and regulations governing seeds, plants, and weeds; these requirements include but are not necessarily limited to:

the Noxious Weed Control Act and all rules, regulations, or control measures by a noxious weed control district embracing Los Alamos County, New Mexico; and the Harmful Plant Act and all rules, regulations, or control measures.

1.4 DELIVERY, STORAGE AND HANDLING

Deliver packaged materials in sealed containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery, and while stored at site.

PART 2 PRODUCTS

2.1 SEED

- A. Obtain native grass seed from sources in New Mexico or Utah unless proof is provided that a particular seed is unavailable.
- B. Obtain shrub and wildflower seed from sources in Utah, Colorado, New Mexico, or Arizona.
- C. Furnish certification showing origin of seed and pure live seed (PLS) content as determined by a certified authority. Provide bags of seed that are tagged and sealed in accordance with the State Department of Agriculture or other local certification authority within the state of origin. The tag or label shall indicate analysis of seed and date of analysis, which shall not be more than 9 months prior to delivery date. Seed may be premixed by the seed dealer and appropriate data indicated on the bag label for each variety. Refer to Drawings for seed mixture and rate of application.

2.2 HYDROMULCH/TACKIFIER

- A. Provide mulch material consisting of virgin wood fibers manufactured expressly from whole wood chips. Process the chips in such a manner as to contain no growth or germination inhibiting factors. Do not produce fiber from recycled material such as sawdust, paper, cardboard, or residue from pulp and paper plants.
- B. Combine the mulch with a colloidal polysaccharide tackifier that has no growth or germination inhibiting factors and is nontoxic. Apply the uniform mixture to the seeded area.
- C. Bagged mulch/tackifier mix that is homogenous within the unit package may also be used. Tackifier shall adhere to the fibers, during manufacturing, to prevent separation during shipment and to avoid chemical agglomeration during mixing in the hydraulic mulching equipment.

2.3 SOIL RETENTION BLANKET

- A. Provide soil retention blanket, of a uniform web of interlocking wood fibers, with a backing of mulch net fabric on one side only. Produce the wood fibers from aspen wood 0.021 inch by 0.042 inches, plus or minus 25 percent with the length 6 inches or longer. Minimum blanket size is 36 inches by 1/4 inch thickness before placing. Provide blanket net fabric with a mesh size 5/8 inches by 3/4 inches maximum, of extruded polypropylene with 1 to 2 percent carbon black additive. Roll weight shall average 0.8 pound per square yard, plus or minus 10 percent, and noted on the roll wrapper or attached tag.
- B. Staples: U-shaped, 11 gauge or heavier steel wire, minimum leg length of 8 inches after bending with a throat approximately 2 inches wide.
- C. Wood Stakes: Use 2in. x 2in. x 12in. pine or fir stakes, beveled at one end in place of wire staples in tuff locations.

2.4 STRAW MULCH

- A. Provide straw mulch that is perennial native or introduced grasses of fine stemmed varieties. At least 65 percent of the herbage by weight of each bale of straw must be 10 inches in length or longer. Hay with noxious seeds or plants will not be acceptable. Rotted, brittle or molded hay will not be acceptable. Marsh grass or prairie hay composed of native grass species to be seeded will be acceptable. Tall wheat grass, intermediate wheat grass, switch grass or orchard hay will be acceptable if cut prior to seed formation. Provide marsh grass composed of mid to tall native grasses (usually tough and wiry grass and grass-like plants found in the lowland areas within the Rocky Mountain Region).

2.5 AMENDMENTS

- A. Fertilizer: FS-O-F-241, Type [I] [II], Grade [A] [B]; recommended for grass, with 50 percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil [as indicated in analysis] [to the following proportions: Nitrogen [] percent, phosphoric acid [] percent, soluble potash [] percent].
- B. Water: Clean, fresh and free of substances or matter which could inhibit vigorous growth of grass.
- C. Sand: Clean, washed, free of toxic materials.

PART 3 EXECUTION

3.1 PREPARATION

- A. Preparation of the Seed Bed:
 - 1. Prepare the seed bed to a maximum depth of 4 inches by tilling with a disc harrow or chiseling tool. Uproot all competitive vegetation during seed bed preparation and work the soil uniformly to a smooth surface free of clods, large stones, over 2 inches in any dimension, or other foreign material that would interfere with seeding equipment.
 - 2. Do not till on ground that is already loose to a depth of 2 inches or more that has undergone regrading and fill. Till newly cut slopes.
 - 3. Perform tillage across the slope when practical and perform in two direction whenever one pass is insufficient to adequately break up the soil.
 - 4. Do not do work when the moisture content of the soil is unfavorable or the ground is otherwise in a non-tillable condition. Do not till when wind speeds are over 10 mph or it will result in dust problems for adjoining areas.
 - 5. The extent of seed bed preparation must not exceed the area on which the entire seeding operation can be accomplished within a 24 hour period.
- B. Apply fertilizer uniformly to the prepared seed bed at the rates specified on the Drawings. Delay application of fertilizer if seeding will not follow within a day.
- C. Prepare the seed bed again if prior to seeding the Contract Administrator determines that rain or some other factor has affected the prepared surfaces and that it may prevent seeding to the proper depth.

3.2 APPLICATION OF SEED

- A. General:

1. Apply seed mix at the rate defined in the Drawings.
 2. Do not seed before May 1, after September 15, during windy weather, or when the topsoil is dry, saturated or frozen.
 3. Calibrate seeding equipment in the presence of Construction Inspector to determine that the equipment setting is appropriate to distribute the seed at the specified rates.
 4. Unless otherwise shown on the Drawings, seed areas disturbed by or denuded by construction operations or erosions.
 5. Use markers to ensure that no gaps will exist between passes of the seeding equipment.
- B. Drill seeding:
1. Refer to the Drawings for the seed mix and rate. Uniformly apply the prescribed mix and rate over the area to be seeded as follows:
 - a. Accomplish seeding operations, where practical, by drilling in a direction across the slope. Plant seed approximately 1/2 inch deep. The distance between the drilled furrows must not exceed 4 inches. If the furrow openers on the drill exceed 4 inches, drill the area twice to obtain a 4 inch distance between furrows. Seed with grass wheels, rate control attachments, seed boxes with agitators for trashy seed and separate boxes for small seed.
- C. Broadcast Seeding:
1. Where indicated on the Drawings, or where it is not practical to accomplish the seeding by drilling, mechanically broadcast the seed by use of hydromulch slurry blower or a rotary spreader or a seeder box with a gear feed mechanism. If seeding is done with a slurry blower, use the highest pressure and smallest nozzle opening which will accommodate the seed.
 2. Immediately following the seeding operation, lightly rake the seed bed or loosen with a chain harrow to provide approximately 1/2 inch of soil cover over most of the seed.
 3. Vehicles and other equipment are prohibited from traveling over the seeded areas.

3.3 HYDROMULCHING/TACKIFIER: Slopes flatter than 2:1, Irrigated Projects

- A. Immediately following the raking/chaining operation, apply hydromulch fibers with tackifier to seeded areas at the rate shown on the plans. Mix slurry in a tank with an agitation system and spray, under pressure, uniformly over the soil surface.
- B. Use both horizontal and vertical movements in the applicator to achieve an even application of the slurry material. Keep all materials in uniform suspension throughout the mixing and suspension cycle when using hydraulic mulching equipment.

3.4 STRAW MULCH: Slopes flatter than 2:1, Non-Irrigated Projects

Immediately following the raking/chaining operation, add straw mulch to the seeded areas as shown on the Drawings.

- A. Apply straw mulch at a minimum of 1.5 tons per acre of air dry material. Spread the straw mulch uniformly over the area either by hand or with a mechanical mulch spreader. When

spread by hand, tear the bales of straw apart and fluff before spreading. Do not mulch when wind velocity exceeds 10 mph.

- B. Wherever the use of crimping equipment is practical, place mulch in the manner noted above by anchoring it into the soil. Use a heavy disc such as a mulch tiller, with flat serrated disc at least 1/4 inch in thickness, having dull edges, and spaced no more than 9 inches apart to anchor the mulch into the soil, with discs of sufficient diameter to prevent the frame of the equipment from dragging the mulch. Anchor mulch a minimum depth of 2 inches and across the slope where practical with no more than two passes of the anchoring equipment.
- C. If mulched areas cannot be anchored by crimping, provide hydromulch wood fibers with tackifier at the rate of 500 lbs. per acre. Mix slurry in a tank with an agitation system and spray under pressure, uniformly over the soil surface. Keep all materials in uniform suspension throughout the mixing and suspension cycle when using hydraulic mulching equipment. Mix 400 lb. of wood fiber with 100 lbs. of tackifier.
- D. Use both horizontal and vertical movements in the applicator to achieve an even application of the slurry material.

3.5 SOIL RETENTION BLANKET: Slopes 2:1 and Steeper, Irrigated and Non-Irrigated Projects

- A. Place retention blankets over native grass seeding immediately following the raking/chaining operation.
- B. Place the blanket with the netting on top and the wood fibers in contact with the soil over the entire seeded area.
- C. Lay the blankets either horizontally or vertically to the slope. Butt ends and sides snugly and staple.
- D. Use a 3 ft minimum blanket in swales and ditches, unrolled in the direction of water flow, and lapped 4 inches over the adjoining roll. Staple blanket at joints, corners, and at approximately 5 foot intervals along the sides. Bury ends and edges to prevent undercutting by water and wind.
- E. Drive blanket staples vertically into the ground, spaced approximately 2 yards apart, on each side, and one row in the center alternately spaced between each side (60 staples on each blanket). Use a common row of staples on adjoining blankets.
- F. Use wood stakes on tuff slopes, in place of wire staples. Use the same installation rate as for staples. Drive stakes in perpendicular to the slope and leave 2 inches exposed above soil grade.

3.6 WATERING

- A. Where temporary watering is required for seeded areas, provide temporary water system which may be a sprinkler system, or a water truck with a spray boom or any other method satisfactory to distribute a uniform coverage of clean water (free of oil, acid, salt or other substances harmful to plants) to previously seeded and mulched areas.
- B. If a temporary sprinkler system is used, keep all pipe connections tight to avoid leakage and loss of water, and to prevent washing or erosion of growing areas. Maintain sprinklers in proper working order during watering.
- C. Do not drive trucks with spray systems on seeded areas ensure the water force does not cause movement of the mulch or seed on the ground.
- D. Apply water during the periods specified in the schedule shown on the Drawings. Apply

water at a maximum of 1/2 inch/hour for 2 hours. Additional applications of water may be made as designated by the Contract Administrator. The water source will be approved by LANL prior to use.

3.7 MAINTENANCE

- A. Begin maintenance immediately after planting.
- B. Maintain seeded areas for not less than 60 days after final acceptance and longer as required to establish an acceptable native grass cover.
- C. If required, maintain native grass seeded areas by watering operations with truck or with temporary sprinkler system to maintain moisture in ground at least within 1 inch of surface. Continue watering until grass stand is established to minimum 1 inch height or a minimum of 6 weeks.
- D. Reseed void areas greater than 6 square feet or repetitive voids greater than 2 square feet amounting to more than 10 percent of any area that appears 30 days after installation.
- E. Keep native grass areas free of weeds until acceptance by LANL.

3.8 CLEANUP AND PROTECTION

- A. After completion of the work, clear the site of excess soil, waste material, debris and objects that may hinder maintenance and detract from the neat appearance of the site.
- B. Protect work and materials from damage due to seeding operations, operations by other contractors and trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged work as directed.

3.9 ACCEPTANCE

- A. Seeded areas will be reviewed for acceptance by LANL when there is a uniform density of grass at least 2 inches tall and all areas are free of weeds.
- B. In the event that all other work required by the Contract is completed before an acceptable grass cover is achieved or because of seasonal limitations, partial acceptance of the work will be made with final acceptance delayed until a satisfactory grass growth has been established.

END OF SECTION